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## Parental Knowledge of Shaken Baby Syndrome: Effects of a High Risk Parent Teaching Program on Incidence of Abusive Head Trauma

### Introduction

Shaken baby syndrome, also known as Abusive Head Trauma, is a deadly brain injury caused by a person violently shaking an infant or toddler. It is usually caused by a distressed parent or caregiver. According to the Department of Pediatrics at Yale University, “abusive head trauma is the leading cause of traumatic death in infancy and causes considerable morbidity in children younger than 2 years” (Bechtel et al., 2011, 481). The amount of time the child was shaken could be 10 seconds or one minute; it does not matter, a head injury will occur.

When the baby or child is violently shaken, the brain shows internal bleeding, bruising, and swelling. Brain cells are destroyed and oxygen is prevented from entering the brain (Bechtel et al., 2011, p. 481). This occurs because the infant’s neck muscles are not strong enough to fully support the head. Normal play interaction with a child, like “bouncing the baby on a knee or tossing the baby up in the air” (Hershberger, 2014) will not cause abusive head trauma.

Symptoms of SBS include bleeding in the retina portion of the eye, breathing problems, pale or bluish skin, coma, fractures in ribs, skull or bones, vomiting, tremors, difficulty staying awake, etc. (Centers for Disease Control and Prevention [CDC], 2012). Research has shown that children with “special needs, multiple siblings, or conditions like colic, or GERD have an increased risk of [abusive head trauma]” (Hershberger, 2014). Also boys under the age of 2 years are more likely victims of abusive head trauma and also children under the same age who live in a single parent’s home and/or below poverty line (Hershberger, 2014).

Over the past few decades it has become more common to learn about a death of an infant or toddler due to an abusive head injury caused by a parent or caregiver out of caregiver

distress. The number of children dying from these injuries has increased over the years at an alarming rate. Before children are born, many prenatal programs and hospital units are implementing teaching strategies to help parents reduce its incidence. Researchers are hoping to test that parents that have completed an education program about Shaken Baby Syndrome (SBS) and a decrease in the number of children who are sent to the hospital for abusive head injuries (Altman et al., 2011, p. 1164).

Research demonstrates that when people are educated on a certain topic or issue they are able to make positive decisions when the problem or issue arises associated with it. The significance of SBS is the morbidity and mortality are needed to fund different education for parents to prevent abusive head injuries in infants. Healthcare professionals in pediatric settings are advocates and voices for these children. New prevention education programs for SBS need to be targeted toward parents during prenatal care, parents of newborns before discharge from the hospital and parents when they bring their children in for wellness checks.

Healthcare professionals observing risk factors is another way to intervene to reduce the incidence of abusive head trauma. It is believed that by reducing the risk factors of parents there will be a less chance of parents engaging in abusive head trauma injuries. Many risk factors include low socioeconomic status, young parents, single parent homes, males, and having a child younger than 2 years of age (Niederkrötenhaler, et al., 2013, p. 447). Through early interventions of people with high risk factors, the Pediatric Abusive Head Trauma (PAHT) believes that such incidences of SBS can be 100% preventable (Gordy et al., 2013, p. 193).

Many times when a parent or caregiver is taking care of a child they unconsciously shake the child without knowing their strength. They may be overwhelmed over a crying baby

or some other type of stressor. Education programs to prevent abusive head trauma include resources that parents and caregivers can use to release stress without harming themselves or the children (Bechtel et al., 2011, p. 482). It is very important that people are educated on this matter, because parents and caregivers may not be knowledgeable on how much shaking a baby can impact the baby's health (CDC Prevention, 2012).

### **Purpose Statement**

The purpose of this research is to determine if parents and caregivers are educated about SBS, the incidence of SBS decreases.

### **Research Question**

What is the effect of a new parent teaching programs on the rate of occurrence of SBS?

### **Identification of Study Variables**

The independent variable will be an educational program to teach parents and caregivers about SBS and the causes and outcome of abusive head trauma compared to education parents' caregivers receive on child care. The dependent variable is the incidence of SBS.

### **Study Hypothesis**

The null hypothesis is the rate SBS does not differ for parents who attend an education program on SBS versus those parents who do not attend. The research hypothesis is that the education program on SBS will decrease the rate of SBS for parents attending the program compared to those who do not attend.

## **CHAPTER 2**

### **Review of the Literature**

#### **Conceptual Framework**

This research conducted by New York Medical College studied that through low cost prevention program delivered by maternity nurses, the incidence of newborns sustaining abusive head trauma injuries were reduced (Altman, et al., 2011, p. 1164). The research was conducted over the course of 8 years in 19 community hospitals and one children's hospital in the New York State Hudson Valley region. It was split up in a five year control period and a three year post implementation period and during this time sixteen infants were born and used for the purpose of this research. The program consisted of handing out a pamphlet discussing abusive head traumas and how it can be prevented and an eight minute video. All together the program costs \$4.80 which included the development of the program and set up cost per newborn. The nurses were responsible for making sure each newborn parent received this information.

#### **Conceptual Framework**

Primary prevention as an intervention is used as a preventive measure before the system or person is able to react to the stressor (George, 2011, p. 345). Primary prevention gives strength and supports the "flexible line of the defense" (George, 2011, p. 345) which in research purposes will be the parent or caregiver, by preventing stress and the lower the risk factors. During this time, the stress and risk factors are identified and, after being thoroughly assessed, there is a plan of action made up to either prevent the risk factor or how to handle it. An example of a plan of action or intervention would be education, immunizations, or a lifestyle change (George, 2011, p. 345).

Secondary prevention as intervention happens when a reaction occurs after there was a reaction to the stressor. Intervention is usually geared towards the symptoms associated with the reaction. The secondary prevention not only works towards treating the symptoms but also strengthening the system from possible future stresses and help get the system to how it used to be or better. Just like a human fighting an infection if the interventions from the secondary prevention fail, the whole system can fall apart. Examples of secondary intervention include being treated in a hospital, taking medication, or seeing a specialist.

Tertiary prevention as an intervention is the last preventive measure that occurs after secondary preventions have been performed, almost like a follow up. The purpose of tertiary prevention is to make sure that the system continues with the secondary preventive measures. This step can be used as a backup to primary prevention but this type of prevention is always done after secondary prevention. An example of tertiary prevention is a follow up physician's visit or a rehabilitation center.

Through literature conducted from 2009 to 2014, it will be shown that the outcome of the number of patients admitted to the hospital for abusive head trauma related to SBS is reduced when the parents are educated. Also, parents are not victimized but instead receive about the stress and frustration that comes with a newborn in the household. In many of the literatures parents can identify resources that they can use as an outlet when stressed with a newborn. In the research, the parents will receive the educational intervention. The study will compare the number of SBS for parents who were educated compared to those parents in the past who did not receive the education about abusive head trauma related to SBS. The literature focuses on the different ways that the education is given to parents whether by video, pamphlet, and/or by a

licensed health care professional teaching. Characteristics that put certain parents and caregivers at high risk will be considered in the education program.

The type of intervention that is being used in the research study is primary prevention. Through primary prevention as an intervention, health care professionals have a chance to increase awareness about the high rate of abusive head trauma related to SBS for parents and caregivers. Parents and caregivers are also told about possible stressors and ways to handle them. Using Neuman's model, health care professionals and researchers can eliminate problems before the situation even begins. Health care professionals will specify high risk groups that historically have had a higher incidence of SBS. The intervention will foster an open relationship with healthcare professionals and parents. The purpose of the intervention is to help parents and caregivers not to feel alone and help them understand that it is okay for them to be frustrated. The interventions gives them an understanding of what the negative outcomes of their stress can do.

### **Empirical Research**

New York Medical College studied the outcome of distributing a leaflet explaining SBS and how to prevent it and also an 8 minute video and the cost of the program. Through low cost prevention program delivered by maternity nurses, the incidence of newborns sustaining abusive head trauma injuries were reduced (Altman et al., 2011, p. 1165). The research was conducted over the course of 8 years in 19 community hospitals and one children's hospital in the New York State Hudson Valley region. It was divided into a 5- year control period and a 3 year post implementation period. During this time 16 infants were born and used for the purpose of this research. The program consisted of handing out a pamphlet discussing abusive head traumas and

how it can be prevented and an 8-minute video. The program cost \$4.80 which included the development of the program and set up cost per newborn. The nurses were responsible for making sure each newborn parent received this information.

### **Level 1**

According to Bechtel et al. (2011) at the Department of Pediatrics at Yale University, the prenatal period is a good time for health care providers to observe the interactions between the soon to be parents and also increase a tight bond with the parents and infant while still in utero. The post-partum period is when it is “conductive to delivering information to caregivers about the dangers of shaking an infant” (Bechtel et al., 2011, 483). In 2007, the department of pediatrics created a “Take 5 Safety Plan for Crying” that was included as part of the anticipatory guidance education to newborn parents and caregivers at Yale-New Haven Children’s Hospital. Not only did the pamphlet include information about abusive head trauma, it also included information about age appropriate car seats, safe sleep practices, umbilical cord care, diaper care, etc., and the information was delivered by pediatric residents. The study was conducted on 10 mothers who gave feedback about the acceptability, feasibility, and content of the intervention. In the pamphlet, related to SBS, it was given that:

If the caregiver becomes frustrated with an infant’s crying: The caregiver should put the infant down on his/her back in a safe place, then walk out of the room. The caregiver was encouraged to do something to relax or calm down. The caregiver was encouraged to call a friend, family member, or the infant’s doctor for help in dealing with the infant’s crying, or to call someone to come to the house to watch the infant if the caregiver wanted to leave the house in order to calm down. The caregiver as advised not to return



to the infant's room until he or she was calm enough to safely care for the infant. Crying can be a normal part of an infant's development and does not necessarily indicate that there is something wrong with the infant or with the caregiver's ability to soothe the infant. Crying does not hurt infants, but getting frustrated with crying can lead one to shake the baby. The caregiver was reminded never to shake a baby and to remind other caretakers of the baby to never shake a baby (Bechtel et al., 2011, 483).

Another study in 2009 by Barr, found that mothers were more knowledgeable and aware of their actions and stressors that could lead to SBS when they received informational material regarding infant crying and stressors of newborn parents and caregivers. The participants were randomly chosen from hospitals in the Greater Vancouver Area, British Columbia, between May 2005 and November 2006. Participants included mothers who had an uneventful pregnancy, with one child born after 37 weeks gestation. These mothers also had to have access to a DVD player and spoke English. The mothers received a "Period of PURPLE Crying materials (an 11 page booklet and a DVD)" and a diary with instructions" (Barr et al., 2009, p. 1165). The PURPLE materials were created by the National Center on SBS and each letter in PURPLE stood for a property of crying in healthy infants that would frustrate. The P for peak pattern which is believed that crying increases during the second month and declines after. U is the unexpected timing of the crying outburst. R is the child's resistance to being soothed. P is for pain-like look on the child's face. L is for long crying outbursts. E is evening crying outbursts. By stating this, it helps mothers and caregivers understand that these are normal things that every infant goes through and will help lessen the stress and worry that parents and caregiver may have. The point of the National Center of SBS is to familiarize points that many of the parents will go through so they do not feel overwhelmed. Five weeks after birth the mothers received a questionnaire about

their new “knowledge about crying and shaking, behaviour in the past month in response to crying and inconsolable crying, the number and relationships of caregivers other than mother, and whether information was shared with each caregiver” and the data are compared to the characteristics of parents in the past who knew little about SBS (Barr et al., 2009, p. 1165). The answers from the questionnaires proved that after reading the PURPLE materials the mothers felt less stressed out when any of the characteristics of PURPLE occurred and were better able to handle which lead to an decrease in stress and incidence of SBS” (Barr et al., 2009, p. 1166).

According to UNICEF in 2003, New Zealand has had an increase in number of child abuse incidences and the incidence of abusive head trauma was about 15% to 20% for every 100,000 children under two years of age (Friedman et al., 2012, p. 760). In 2005, a pediatric neurosurgeon described a way to reduce the incidence of abusive head trauma. The intervention was that health care professionals would provide a detailed 15-minute conversation about the dangers of SBS and ways to handle high stressful infant crying situations, a one page leaflet, and a video that lasts 11 minutes. The intervention occurs before discharge. A similar study was done in New York and it brought a 75% reduction in the incidence of abusive head trauma (Friedman et al., 2012, 760). The intervention was called “simple in concept and cheap to deliver” (Friedman et al., 2012, 761).

Parent education regarding prevention of SBS reduce the incidence of abusive head trauma in SBS in (2011) investigation. Three hospitals in Kentucky educated their nursing staff and the staff consequently created a parent education program. Part of the education included signs and symptoms of abusive head trauma and its effects (Gibbs, 2011, p. 27). The program consisted of watching a video called ‘Portrait of Promise: Preventing SBS’, having a discussion with health professional staff, and a signed slip agreeing to receive the intervention and agreeing

to perform the necessary precaution to prevent SBS (Gibbs, 2011p. 27). The program was implemented for all new parents in the Norton Health System. Feedback from the program was positive and parents and caregivers expressed their gratitude on the education they received. Incidences of SBS were low during the time frame the program was in place. Now, the program is to be implemented throughout all the hospitals in the state of Kentucky (Gibbs, 2011, p. 27).

According to the articles, by implementing some type of supplemental education about SBS, incidences of abusive head trauma in the ER related to SBS decreased. Parents also were more prepared about what to expect in their newborns in their first few months of life. Possible stressful situations were addressed and parents were given tips on how to handle it. The education gave parents a sense of confidence and security on their parenting and allowed to not feel alone.

## **Chapter 3: Methods**

### **Design**

A quasi-experimental design study will test the difference in rates of SBS for two groups of parents and caregivers. The experimental group includes parents and caregivers who are given information as a preventive intervention for SBS. The comparison group consists of parents and caregivers who do not receive the experimental intervention on SBS as a preventive intervention. The study will last approximately 2 years. After the intervention has been implemented with the experimental group, participants in the experimental and comparison groups will be contacted via email or text messages to complete a survey. Throughout data collection, researchers will evaluate a decrease in Abusive Head Trauma in children for parents and caregivers who receive the intervention. Data showing the decrease in rates of SBS will come from Emergency Room and Police reports for the next two years.

### **Sample and Setting**

The subjects will be parents and caregivers of newborns born in the next two years at Pennsylvania Hospital. They must have cell phones or computer access with reliable internet connections. The sample will be chosen by providing the intervention to those chosen by hospital identification numbers. Newborns' parents whose hospital identification numbers are even will receive the intervention and those whose identification numbers are odd will not receive the intervention. The subjects will come from different backgrounds and different economic statuses. Parents or caregivers who are single and have more than one child or a newborn with health concerns are included in the study. These criteria demonstrate SBS risk factors.

Subjects who fit the risk factor criteria will receive the educational program including supplemental information and will have more frequent contact with the researchers. Each research group will have 50 subjects and each subject will be required to have a cell phone with texting/data plan or a home computer with reliable internet access. The subjects must keep in touch with researchers every month. Researchers will also be in contact with social services of Philadelphia Health Department in the case that there is an incidence of abusive head trauma. Both groups will be given resources so that if they feel stressed and need an outside source to help, they will have someone to reach.

The setting for the study is Pennsylvania Hospital in Philadelphia, PA. Pennsylvania Hospital is known as the first hospital in the United States (Penn Medicine, 2014). The hospital includes over 600 patient beds and births over 5,000 babies annually. The obstetric unit not only caters to women in labor and delivery, but also specializes in prenatal genetic diagnosis and screening, family planning and pregnancy loss, breastfeeding, prematurity prevention, etc. (Penn Medicine, 2014).

### **Ethical Considerations**

Before conducting the research, permission will be asked from the Institutional Review Board of Pennsylvania Hospital to review and approve the study of the decrease in incidences of SBS after parents have received supplemental information on the topic. Consent forms will be distributed to participants that are interested in the study and they have two weeks to sign it and send it back. Participants will also be given information about the study, including how long it will run and are encouraged to ask questions regarding the study.

The researcher is aware of the risks that are associated with the study, especially with children and has implemented interventions to help reduce the risks. Before the subjects sign the consent form, a background check will be implemented to screen out subjects with a record of abuse or specifically child abuse. The subjects will also be told in detail the full process of the study, including the length of time it will take place and also told that for whatever reason, they choose to opt out of the study with nothing held against them. Although the experimental group is receiving supplemental information to reduce their risk of SBS, police and social work is available around the clock to both groups when they feel like they need help.

The subjects are also not identified by their names but instead hospital identification numbers. Data obtained by the researchers are stored in an Excel sheet that has nothing but to the hospital identification number to associate the subject with their data. At the end of the research, the subjects will have the opportunity to have their individual data sheeting from the study or having it shredded. Formal IRB consent from the university is included in (Appendix C).

## **Instrument**

An investigator created profile will ask questions on demographic characteristics of participants, and how well they manage their stress on a scale of 1 (= minimal stress) to 5 (= major stress). The rate of SBS will also be recorded on the profile. The study will take approximately 2 years to complete. Twice a month the researchers, will check in with the participants and see how things are going and evaluate them. Researchers will also be very vigil for any signs of potential abuse.

**Reliability and Validity**

Inter-rater reliability will be calculated on 25 charts from both groups to determine the present agreement with the data entry. Two investigators will independently transcript the data form from the profile to the data entry spreadsheet of the statistical analysis program.

**Data Collection**

Participants will be picked based on their hospital identification numbers. They will each be contacted via email and phone with the information provided on the flyer from Appendix A. If they are interested, they will come for an interview and be asked questions based on their risk factor and education about SBS. Once the participants are selected, they will be thoroughly informed about the step-by-step process of the study and sign the consent form. The participants will be routinely informed that at any point they may leave the study.

Once 50 participants are obtained for the experimental and comparison groups, the study will begin. The experimental group will receive supplemental information about abusive head trauma related to SBS and prevention tips. The education will be shared via short video clips and easy to read brochures. The comparison group will receive no education about SBS aside from the information that they received before discharge after the birth of the newborn. Both groups will be encouraged to contact outside resources if they feel overwhelmed at any point and feel like they may injure themselves or the child. Twice a month for 24 months, email messages will be sent to the participants with a survey about they manage their stress and document demographic characteristics. All surveys must be completed within 5 days of sending out the email. Any incidences of SBS will be recorded and all cases will be sent to the police department, Philadelphia health department and also social work immediately.

### **Chapter 4: Data Analysis**

Descriptive statistics will be used to compare the demographic characteristics and risk factors between the participant groups. The study will be complete after 24 months and the results from the survey on the dependent variable of rate of SBS will be tested by comparing the SBS rate by experimental and comparison groups. The experimental group that received the supplemental education program on SBS will show a decrease in the rate of SBS compared to those who do not attend the supplemental education program. The t test will be used to help determine the difference in rates of SBS. The hypothesis is a one-tailed t-test: there is a decreased rate of SBS for parents and caregivers who received their experimental intervention compared to those who did not receive it.



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